



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 10/709,472      | 05/07/2004  | Ramachandra Divakaruni | FIS920030392        | 3471             |

30449 7590 01/04/2005  
SCHMEISER, OLSEN + WATTS  
3 LEAR JET LANE  
SUITE 201  
LATHAM, NY 12110

EXAMINER

TSAI, H JEY

ART UNIT PAPER NUMBER

2812

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/709,472

Applicant(s)

DIVAKARUNI ET AL.

Examiner

H.Jey Tsai

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11/1/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-20 is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### ***Claim Objections***

Claim 12 is objected to because of the following informalities: the dependency of claim 12 is unknown. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6-10, 12-13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Tews et al. 6,599,798, previously applied.

The reference(s) teach the features :

Tews discloses a method of forming a buried dielectric collar around a trench, comprising:

forming a trench in a substrate, fig. 2+, col. 3, lines 60+,

forming a multilayer coating 20/21/24 on sidewalls and a bottom of the trench,

removing a continuous band of multilayer coating from the sidewalls a fixed distance from a top of said trench to expose a continuous band of substrate in the sidewalls of said trench,

etching, in the exposed trench extending into the trench,

Art Unit: 2812

filling the lateral trench with a dielectric material to band of substrate, a lateral substrate in the sidewalls of form a buried dielectric collar,

buried dielectric collar extends continuously around the trench (recess formed around the trench) , col. 4, lines 31+ and fig. 5,

buried dielectric collar extends into said trench.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mandelman et al. 6,373,086, previously cited, in view of Level of skill of an ordinary person in the art..

The reference(s) teach the features :

Mandelman et al. discloses a method of forming a buried dielectric collar around a trench, comprising:

forming a trench 42 in a substrate (note, the trench bottom is not shown), fig.14C, col. 7, lines 21+,

forming a multilayer coating 44/52/56 on sidewalls and a bottom of the trench,

Art Unit: 2812

removing a continuous band of multilayer coating from the sidewalls a fixed distance from a top of said trench to expose a continuous band of substrate in the sidewalls of said trench,

etching, in the exposed trench extending into the trench, fig. 14e or fig.15d,

filling the lateral trench 30 with a dielectric material to band of substrate, a lateral substrate in the sidewalls of form a buried dielectric collar, fig. 15F,

buried dielectric collar extends continuously around the trench (recess formed around the trench) ,

buried dielectric collar extends into said trench,

a multiplayer coating of oxide/nitride and polysilicon layer,

filling the trench with polysilicon layer 70,

using resist layer in the trench and forming a oxide/nitride/polysilicon multiplayer on the sidewall of the trench, col. 7, lines 30+ and figs. 14c.

since, Mandelman et al. teaches at fig. 9a-10 and col. 6, lines 6+, forming layer 52 on the sidewall and bottom wall of trench 40, then RIE etching to obtain spacer 56 on the sidewall and at col. 7, lines 28+, forming spacer layer 44/56 by using deposition and RIE, hence, It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that mutilayer 44/52/56 formed in the trench 42 of figure 14d is formed on the sidewall and bottom wall of the trench 42 to obtain the same spacer 56 on the sidewall of the trench 42 as shown in fig. 14C.

Art Unit: 2812

Claims 4-5, 11 and 14-20 are rejected under 35 U.S.C 103 as being unpatentable over Tews et al. as applied to claims 1-3, 6-10, 12-13 above, and further in view of Mandelman et al. 6,373,086, both are previously cited.

The difference between the references applied above and the instant claims) is: Tews et al. teaches forming a collar in the trench with an oxide/nitride multiplayer coating but does not teach using a resist layer and oxide/nitride and a polysilicon layer as a multiplayer coating. However, Mandelman et al. teaches at col. 7, lines 21+ and figs. 14c that using resist layer in the trench and forming a oxide/nitride/polysilicon multiplayer on the sidewall of the trench.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a resist layer formed in the trench and using a multiplayer coating as taught by Mandelman et al. because resist layer and multiplayer coating is used as a mask for lateral etching the sidewall of the trench.

### ***Allowable subject matter***

Claims 15-20 are allowable over prior art of record.

### ***Conclusions***

Applicant's arguments filed on Nov. 1, 2004 have been fully considered but they are not persuasive. Because Tews et al. clearly teaches in fig. 3, forming multilayer

Art Unit: 2812

20/21/24 on sidewalls and a bottom of the trench. Layers 21/24 may not directly contact the bottom wall but still form on the bottom wall having layer 22 formed between. And, Mandelman et al. teaches at fig. 9a-10 and col. 6, lines 6+, col. 7, lines 28+, forming layer 52 on the sidewall and bottom wall of trench 40, then RIE etching to obtain spacer 56 on the sidewall and at col. 7, lines 28+, forming spacer layer 44/56 by using deposition and RIE., hence, It would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that multilayer 44/52/56 formed in the trench 42 of figure 14d is formed on the sidewall and bottom wall of the trench 42 to obtain the same spacer 56 on the sidewall of the trench 42 as shown in fig. 14C.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2812

Any inquiry of a general nature or clerical matters or relating to the status of this application or proceeding should be directed to the Group customer service whose telephone number is (703) 308-4357.

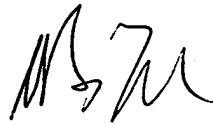
Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679.

The fax phone number for this Group is (703) 872-9306.

hjt

12/12/04



H. Jey Tsai  
Primary Examiner  
Patent Examining Group 2800